

FLORA  
OF THE PRAIRIE PROVINCES

Bernard Boivin

Part IV -- MONOPSIDA

(continued)

ORCHIDACEAE-JUNCACEAE

Order 69. ORCHIDALES

Flower strongly zygomorphic. Ovary inferior.  
Stamens only 1-2. Pollen aggregated in pollinia.

123. ORCHIDACEAE ORCHID FAMILY

Single family. Style and anthers fused into a complex organ termed gynostegium. Stamen(s) usually not obvious.

- a. Flower single, or exceptional individuals with 2-(3) flowers.
  - b. Leaves 2 or more and in most cases caulinary..... 1. Cypripedium
  - bb. Only one leaf.
    - c. Leaf long linear and developing tardily..... 4. Arethusa
    - cc. Leaf ovate ..... 12. Calypso
- aa. Inflorescence a raceme.
  - d. Leaves 2, opposite..... 6. Listera
  - dd. Alternate or all basal.
    - e. Lower petal spurred.
      - f. Flower cruciform, the upper 3 appendages overlapping; leaf only one, basal,  $\pm$  obovate ..... 2. Orchis
      - ff. Flower stelliform, the appendages divergent ..... 3. Habenaria
    - ee. No spur. Sometimes obscurely spurred in Corallorhiza.
      - g. Leaves numerous.
        - h. No rosette, all leaves cauline and bract-like ..... 9. Corallorhiza
        - hh. Leaves dimegueth, the main ones basal and large, the cauline much reduced and bract-like.
          - i. Lip flattish; rosette leaves lanceolate to linear.....  
..... 5. Spiranthes

- ii. Lip becoming ± hemispheric towards the base; rosette leaves ± ovate...  
..... 7. Goodyera
- gg. Leaves only 1-2. Scape bractless.
  - j. Flowers 4-5 mm wide and greenish ..... 10. Malaxis
  - jj. Larger, 1-4 cm across.
    - k. Leaves 2 ..... 11. Liparis
    - kk. Only 1 ..... 8. Calopogon

1. CYPRIPEDIUM L. LADY'S SLIPPER

Flowers large and very showy with the lip inflated and mostly egg-shaped. Stamens 2 (only 1 in our other genera).

- a. Leaves only 2, basal..... 3. C. acaule
- aa. Stem leafy.
  - b. Flower with a lip and 5 other appendages; lip odd-shaped..... 1. C. arietinum
  - bb. Only 4 other appendages due to the fusion of the lower 2 sepals; lip ± egg-shaped.
    - c. Lip white or yellow.
      - d. Lip white, 1.8-2.5 cm long..... 5. C. candidum
      - dd. Yellow, 2-5 cm long..... 4. C. Calceolus
    - cc. Pink or purple or at least spotted or striped in pink or purple.
      - e. Lip ± 18 mm long, the other appendages shorter..... 6. C. passerinum
      - ee. Flower larger, the lip 2-5 cm long, the other appendages 2.5-7.0 cm.
        - f. Other appendages white, flat ..  
..... 2. C. reginae
        - ff. Deep green to purple brown and twisted ..... 7. C. montanum

1. C. arietinum Br. (Criosanthes arietina (Br.) House) -- Ram's Head -- Lip whitish, heavily veined in purple, mostly 1.5 cm long and ± conical or pyramidal. Leaves 3-4-(5), borne in the upper half of the plant, lanceolate to broadly linear. Herbage thinly pubescent, eglandular. Early summer. Woods; rare and highly localized from Prince Albert eastward. --NS, Q-cS, US, (Eur).

2. C. reginae Walter (C. hirsutum AA.) -- Lady's Slipper, Showy Lady's Slipper -- A large and most handsome white flower with a pink, egg-shaped lip. Leaves 5-10, elliptic. Herbage soft hirsute. Lip 2.5-5.0 cm long, with pink-red dots and wide stripes on a whitish base. Other appendages not twisted. Early summer. Wooded bogs. --NF, NS-Man, US.

3. C. acaule Aiton (Fissipes acaulis (Aiton) Small) -- Lady's Slipper, Mocassin-Flower (Sabot de la Vierge) -- Herb with two large basal leaves and a single, large, reddish flower. Lip 4-6 cm long, irregularly egg-shaped, with a closed cleft along the upper side. Other appendages not twisted. Early summer. Sandy Coniferous woods. --NF-SPM, NS-Alta, US.

It is customary to extend the range north to Mackenzie on the basis of a Richardson collection labelled Great Bear Lake (GH). But this has never been confirmed and it now looks like the locality could have been in error.

4. C. Calceolus L. var. parviflorum (Sal.) Fern. (C. parviflorum Sal.) -- Lady's Slipper, Yellow Lady's Slipper (Sabot de la Vierge) -- Lip yellow, the other appendages brownish and twisted. Stem leaves 3-6, ovate. Herbage glandular-pubescent. Lip 2-3 cm long. Upper sepal 2.5-4.0 cm long. Twisted petals 3-5 cm long. Fruit on a stipe 0.7-0.8 cm long. Early summer. Moist woods or prairies. --Mack-(Y), NF-SPM, NS, NB-BC, US -- Var. pubescens (W.) Correll -- Larger throughout. Lip 3-5 cm long. Upper sepal 4-7 cm long. Twisted petals 5-9 cm long. --NS-sMan, US.

Despite a number of reports to the contrary, var. pubescens does not seem to extend west of Manitoba and all more western specimens examined proved to belong to var. parviflorum.

4X. C. Andrewsii A.M. Fuller -- Hybrid with the next. Lip yellowish. Floral appendages intermediate in size, mostly around 3 cm long. Rare: Brandon. --swO-swMan.

5. C. candidum Muhl. -- Lip white to lightly mauve-tinged, 2 cm long. Herb 2-4 dm high and glandular-pubescent. Other appendages green, + brown-tinged. Upper sepal 2-3 cm long, lanceolate. Twisted petals 2.5-3.5 cm long. Fruit on a stipe 1.5-2.0 cm long. Early summer. Wet prairies, very rare: Woodlands, Brandon, Aweme, Indian Head. --swO-seS, US.

6. C. passerinum Rich. var. passerinum -- Lip creamy-white with large magenta dots. Herbage villous-pubescent, not glandular. Upper sepal 1.5-2.0 cm long, ovate, pale green; lower sepals slightly shorter and nearly completely fused. Lateral petals 1.0-1.5 cm long, flat, whitish. Fruit on a stipe 1.5-2.0 cm long. First half of summer. Wet places, especially flood-plain forests, in northern and low arctic woods. -- (K)-Mack-Aka, O-BC.

In an eastern endemic of Mingania, var. minganense Vict., the calyx is shorter, the upper sepal only 9-13 mm long and the lower appendage (or fused sepals) 7-10 mm long.

7. C. montanum Douglas -- Much like C. Calceolus, but the lip white with purple veins. Herbage glandular-pubescent. Flowers (1)-2-(3). Lip + 2.5 cm long. Other appendages 3.5-7.0 cm long. Terminal fruit on a stipe usually less than 1 cm long. Late spring to early summer. Wet mountain woods: Waterton. --(Aka, swAlta)-BC, US.

## 2. ORCHIS L.

## ORCHIS

Like the next, with a spurred lip, but the upper appendages connivent or connate, the flower thus cruciform. Translators hidden in a small receptacle.

1. O. rotundifolia Banks -- Flower cruciform, mauve in bud, becoming white, with the lip dotted in purple. Leaf only one, orbicular to elliptic. Lip 8-11 mm long, emarginate to bilobed at tip, with a pair of small lobes near the base; other appendages white. First half of summer. Wet woods. --(G, K)-Mack-Aka, NF, NB-BC, US -- F. lineata (H. Mousley) E.G. Voss -- Dots on the lip much larger and confluent into a pair of longitudinal lines. Local: Cypress Hills. --wO, seAlta -- F. Beckettiae Boivin -- Lip white and dotless. Local: Churchill. --Man.

F. Beckettiae was also reported for Jasper by Moss 1959, queried by Boivin 1967. In 1971 there was no such albino on file at ALTA.

## 3. HABENARIA W.

## FRINGED ORCHIS

Lip prolonged at base into a spur. Perianth parts 6, mostly radially disposed.

- a. Leaves all basal.
  - b. Only one leaf. (See also Orchis)...8. H. obtusata
  - bb. 2 or more leaves.
    - c. Leaves linear-spatulate to oblanceolate.....5. H. unalascensis
    - cc. Broader, orbicular to broadly oblong.
      - d. Scape bearing many bracts ..... 7. H. orbiculata
      - dd. With only 1 bract or none..... 6. H. Hookeri
- aa. At least 1 stem-leaf present.
  - e. Spur short; lip bidentate at tip... 1. H. viridis
  - ee. Spur nearly as long as the lip, the latter entire at tip.
    - f. Flowers white; lip abruptly broadened at base..... 4. H. dilatata

ff. Flower greenish; lip linear or gradually tapered at base.

g. Spur of uniform thickness.....

..... 2. H. hyperborea

gg. Spur 2-3 times thicker toward the

tip than at base..... 3. H. saccata

1. H. viridis (L.) Br. var. bracteata (Muhl.) Gray (H. bracteata (Muhl.) Br.; Coeloglossum bracteatum (Muhl.) Parl.) -- Frog-Orchid -- Flowers all or mostly overtopped by a subtending bract. Stem leafy, the leaves + lanceolate. Flower greenish, the lip darker. Spur 2-3 mm long, somewhat less than half as long as the ligulate lip. Early summer. Wet woods. --seK-Mack-(Y)-Aka, NF, NS, NB-BC, US, (Eur).

Also the lower bracts are 2-6 times longer the flowers and the lip is bidentate at tip. By way of contrast, the alaskan and paleocean typical var. viridis has a tridentate lip and shorter bracts, the upper and middle bracts being shorter than the flowers while the lower bracts are less than twice as long as the flowers.

There is no morphological gap between these two varieties and intermediates will turn up here and there throughout the range. Such intermediates are often called var. interjecta Fern. if neogean, or var. Vaillantii (Ten.) Fern. if paleocean.

2. H. hyperborea (L.) Br. (var. huronensis (Nutt.) Farw.; Limnorchis viridiflora AA.) -- Marsh-Lily, Smelling Bottles -- Similar to the first, but the bracts shorter and the spur longer. Bracts overtopped by the flowers, or the lower slightly longer. Flower greenish, including the lip, the latter lanceolate, entire, somewhat longer than the curved spur. Early summer. Very wet places. -- G,K-Aka, L-SPM, NS-BC, US, Eur.

3. H. saccata Greene var. saccata -- Spur much thicker towards the tip. Otherwise quite similar to the last. Perianth two-toned or bicolour, the sepals light green, the petals paler or purplish. Lip linear, entire. Spike usually laxer than in the first two species. First half of summer. Boggy places and subalpine meadows in Waterton and Carbondale River --Aka, swAlta-BC, US.

The alaskan var. gracilis (Lindley) Boivin has a thinner spur, almost filiform, and not thickened toward the tip.

4. H. dilatata (Pursh) Hooker var. dilatata (var. albiflora (Cham.) Correll; Limnorchis dilatata (Pursh) Rydb.) -- Bog-Lily, Perfume-Willow (Vanille) --

Flower white, otherwise similar to the first 3. Spur filiform, 4-10 mm long, commonly about as long as the lip, the latter lanceolate from a broad base. Mid summer. Wet meadows and bogs. --(G), seK-(Mack)-Y-Aka, L-SPM, NS-BC, US, (Eur).

Commonly subdivided into three varieties, mainly on a size basis, and especially of the length of the spur. The typical phase is average and its spur is about as long as the lip. Var. albiflora is a smaller plant, smaller flowered, the spur only 5 mm long or less. In the other extreme, var. leucostachys (Lindley) Ames, the spur is 1-2 cm long and  $1\frac{1}{2}$ -2 times longer than the lip. All three varieties have been reported to range from western U.S.A. north to Alaska.

Var. albiflora is an uncommon type of sporadic occurrence and appears to be of no particular significance; we have submerged it.

Var. leucostachys appears to be better defined and is probably restricted geographically to the western U.S.A. and adjacent B.C. Alaskan reports were discounted by Hultén 1943 and with this we concur as all specimens at DAO, CAN (in 1966) and WTU (in 1969) were revised to var. dilatata. Similarly most B.C. reports are to be discounted, but three (V) of the numerous collections examined did prove referable to var. leucostachys. In many of the specimens examined the lip was quite short, 5-6 mm only and the spur much longer, 8-11 mm long; we have placed all such specimen in dilatata despite the relative proportions of the spur and the lip. We have restricted the use of var. leucostachys to those specimens where the spur not only averaged clearly over 1 cm, but also was much longer than the lip. It is only when both criteria are applied together that var. leucostachys becomes a significant segregate of limited range.

5. H. unalascensis (Sprengel) Watson var. unalascensis -- Like the previous 4 but the leaves all basal and the stem merely bracteolate. Flowers small. Perianth segments 2-4 mm long. Spur from nearly as long to almost twice as long as the lip. Mid summer. Mountain woods. -- Aka, (Q)-O, (Alta)-BC, US, (CA).

In the more western var. elata (Jepson) Correll the spur is commonly 1.0-1.5 cm long and at least twice as long as the lip.

6. H. Hookeri Torrey var. Hookeri -- Solomon's Plaster -- With two large suborbicular basal leaves. Scape naked or nearly so. Basal leaves 5-10 cm long.

Spur 1.5-2.5 cm long and longer than the ovary. Lip 8-12 mm long. Ovary and fruit short stipitate. Sepals glabrous, the upper ovate-lanceolate, somewhat attenuate at tip. Early summer. Wetish woods. --SPM, NS-seMan, US.

The newfoundlander var. abbreviata Fern. is a generally smaller plant, its spur only 0.9-1.5 cm long.

7. H. orbiculata (Pursh) Torrey var. orbiculata (Plantanthera orbiculata (Pursh) Lindley) -- Heal-all -- Quite similar to the last but larger throughout and the upper sepal deltoid-ovate. Basal leaves usually 10-15 cm long, suborbicular, lying flat on the ground. Spur 1.5-3.0 cm long. Ovary and fruit on a stipe at least 5 mm long. Lip 10-15 mm long. Lateral sepals densely papillose or puberulent on the inner side. Early summer. Coniferous woods; uncommon.--Mack, (Aka, L)-NF-SPM, NS-nS-nAlta-BC, US.

The three known Alberta collections are from Faust and Whitecourt (ALTA). These specimens are somewhat smaller than the average for the species and thus somewhat intermediate to the eastern var. Lehorsii Fern. The latter, a Newfoundland and Saint-Pierre & Miquelon endemic, is a generally smaller plant, the stipe shorter, 2-4 mm in flower, spur only 0.8-1.5 cm long. In another eastern variant, var. macrophylla (Goldie) Boivin, the plant is generally larger and the spur 3-5 cm long.

The range of var. orbiculata was extended to Yukon by Correll 1950, repeated by Szczawinski 1959, Hitchcock 1969, queried by Boivin 1967, ignored by Hultén 1943 and 1968. No justifying sheet could be located in the Ames herbarium or at V, UBC, WTU or elsewhere.

8. H. obtusata (Banks) Rich. var. obtusata (var. collecteana Fern.; Lysiella obtusata (Pursh) Rydb.) -- With a single leaf, basal and broadly oblanceolate. Scape 1-3 dm high, bractless. Floral bracts shorter than the flowers. First half of summer. Mossy woods and bogs. --sK-Aka, L-SPM, NS-(PEI)-NB-BC, US.

The eurasian vicariant, var. oligantha (Turcz.) stat. n., Plantanthera oligantha Turcz., Fl. Baif, Dah. 2,2: 182. 1856, is usually a smaller plant with a shorter lip, only 3.0-3.5 mm long.

Previous reports of H. psychodes in southeastern Manitoba were discounted by Scoggan 1957. We have also seen a photograph (DAO), reportedly from the Whiteshell Forest Reserve, of what might be the white form of H. psychodes. However the photo does not lend itself to posi-

tive identification and we consider the occurrence of this species in our area is not yet conclusively demonstrated. See also our comment about photographs under Trillium ovatum.

## 4. ARETHUSA L.

## ARETHUSA

Lip partly adnate to the petaloid column. Sepals petaloid and quite similar to the lateral petals.

1. A. bulbosa L. -- Snakehead, Swamp-Pink -- A small herb almost reduced to its single, large showy, deep pink flower. Stem 1-4 dm high, bearing 2-4 bladeless sheaths, at first leafless, later developing a single grass-like leaf. Flower 4-6 cm long, zygomorphic, arched to one side. Lip spotted in purple. First half of summer. Bogs; rare. --L-SPM, NS-S, US.

## 5. SPIRANTHES Richard

## LADIES'TRESSES

Resembles Goodyera, but the lip flat and entire. Flowers borne in vertical rows, the inflorescence a  $\pm$  twisted spiciform raceme.

a. Flowers in a single vertical row..... 1. S. lacera  
aa. Flowers larger and in 3 rows..... 2. S. Romanzoffiana

1. S. lacera Raf. var. lacera (S. gracilis (Big.) Beck) -- Twisted Stalk -- Flowers spreading horizontally and conspicuously disposed in a single, twisted, vertical row. Herbage glabrous or nearly so. Leaves all basal,  $\pm$  ovate. A very gracile herb. Stem thin and elongate, merely bracted. Perianth about 4 mm long, white but with a green stripe down, the center of the lip. Mid summer. Uncommon in sandy places. --NS-cS, US.

Two other varieties occur further south. Var. brevilabris (Lindley) stat. n., Spiranthes brevilabris Lindley, Gen. Sp. Orch. Pl. 471, 1840, is quite pubescent, especially so in the inflorescence, the rachis withish pubescent. And in var. floridana (Wherry) stat. n., Ibidium floridanum Wherry, Journ. Wash. Ac. Sc. 21: 49. 1931, the raceme is not twisted or only slightly so, and the stripe on the lip is yellow.

2. S. Romanzoffiana Cham. var. Romanzoffiana -- (R s da sauvage) -- A conspicuously twisted spike of white flowers. Much coarser than the first. Basal leaves narrowly lanceolate to linear. Stem leaves similar but smaller. Flowers crowded. Perianth 8-12 mm long. Mid summer. Bogs and sandy places. --Mack-Aka, L-SPM, NS-BC, (US, Eur).

The typical phase is glandular-pubescent at least in the inflorescence, as contrasted with var. porrifolia



(Lindley) Ames & Correll of western U.S.A., a glabrous plant with a more clearly panduriform lip, the terminal segment being about as large as the basal ones.

## 6. LISTERA Br.

TWAYBLADE

Leaves 2, opposite. Lip bifid at tip.

- a. Plant glabrous at least in the inflorescence ..  
 ..... 1. L. cordata  
 aa. Glandular-pubescent, at least above.  
 b. Lip entire or barely emarginate at tip ...  
 ..... 4. L. caurina  
 bb. Obviously bilobed to bifid.  
 c. Lip narrowed to a sessile base .....  
 ..... 3. L. convallarioides  
 cc. Cordate-clasping at base ..... 2. L. borealis

1. L. cordata (L.) Br. var. cordata -- Tway-Blade -- Flower smallest, the lip 3-5 mm long and bifid for about half its length. Leaves deltoid-ovate, often subcordate. Flower greenish and more or less purplish-tinged, especially the lip, the latter with narrowly lanceolate terminal lobes. Early summer. Boggy woods. --G, seK-swMack-Aka, L-SPM, NS-BC, US, Eur.

In a more western variant the flower is merely pale green, not at all tinged in red: var. nephrophylla (Rydb.) Hultén.

2. L. borealis Morong -- A delicate herb with a pair of opposite leaves and a terminal raceme of greenish flowers. Leaves ovate to narrowly elliptic. Rachis glandular-pubescent; pedicels and ovaries glabrous or nearly so. Lip 8-12 mm long, with a pair of terminal lobes about as wide as long. Early summer. Moist Spruce forests. --(K)-Mack-Y-(Aka, NF), seQ-neO-nMan-BC, wUS.

3. L. convallarioides (Sw.) Torrey -- Much like the last, but the lip long cuneate at base. Leaves orbicular to broadly ovate. Rachis pedicels and ovaries densely glandular-puberulent. Lip 8-12 mm long, with a pair of terminal lobes about as long as wide. First half of summer. Boggy coniferous woods. --(Aka), NF-SPM, NS-O, (Alta)-CB, US, (Eur).

The correct bibliographic reference for this name is Torrey, Comp. Fl. N. Midl. States 320. 1826. In an earlier usage by Nuttall, Gen. N. Am. Pl. 2: 191. 1818, it was only a nomen nudum.

4. L. caurina Piper -- Resembles the last two, but the lip shorter. Leaves  $\pm$  ovate. Rachis and pedicels glandular-puberulent; ovary glabrous or nearly so. Lip 5-6 mm long, dilated above the middle into a  $\pm$  obo-

vate or flabellate upper half. First half of summer. Shaded coniferous woods in Waterton --seAka, swAlta-BC, US.

7. GOODYERA Br. RATTLESNAKE-PLANTAIN

Lip deeply concave in the lower half.

- a. Perianth 3.5-4.0 mm long..... 1. G. repens  
 aa. Herb larger throughout, the perianth 6.5-8.0 mm  
 long..... 2. G. oblongifolia

1. G. repens (L.) Br. var. repens (Epipactis repens (L.) Crantz) -- Adder's Tongue (Herbe écartante)-- Small herb with a basal rosette, a bracteate scape and a secund spike of white flowers. 1-3 dm high. Leaves ovate, 1-3 cm long, without white markings. Mid summer. Spruce woods. --Mack-Aka, Man-BC, Eur -- Var. ophioides Fern. (G. ophioides (Fern.) Rydb.) -- Lateral nerves outlined with a double white line. --Aka, L-SPM, NS-ne Alta-BC, US.

Most Alberta specimens are clearly var. repens; a few transitional collections also come from the north-east section. One collection, Dumais & Anderson 3833, Ft. McMurray (ALTA), is clearly referable to var. ophioides and is the only one of its kind that we have seen from Alberta. We have been unable to confirm any of the earlier Alberta reports of var. ophioides.

From repens to ophioides the transition is gradual and occurs over a rather wide area. Ours is the area of transition. East of us the white lines are obvious and all specimens are referable to var. ophioides. West and north of us, nearly all specimens have solid green leaves. But a few collections from B.C. and Alaska are just as strongly lined in white as the average eastern plant and are indubitably to be filed with var. ophioides. The Mackenzie collections are essentially referable to var. repens, but in the more southern reaches (such as Fort Smith or Le Grand Détour) one may find the odd individuals or single leaves weakly lined in white; these could justifiably be regarded as transitional to var. ophioides.

Despite a number of reports, it seems doubtful that var. ophioides occurs in Yukon as all specimens seen belonged to var. repens. At S five sheets turned up under var. ophioides, but were all revised to var. repens. Two of the five sheets were duplicates distributed from Harvard, which may account for the report by Correll 1950, while the other three were among the specimens cited by Porsild 1951, which may account for the latter's report.

G. tessellata Lodd. as reported for Manitoba by Dugle 1969 was based on a collection of G. repens var. repens from Pine Point (PINAWA).

Repeated reports of G. tessellata from our area are no doubt partly related to the poor quality of the morphological discontinuity between G. repens and G. tessellata. This was briefly commented upon by Correll 1950, who noted the existence of intermediates in the Great Lakes area. Case 1964 regarded these as hybrids and remarked "numerous intermediate forms were present in nearly every station where I have found the two together". Returning from an expedition to the Tusket islands, J.S. Erskine (in litt.) reported that "a large patch of Goodyera will yield specimens that vary from repens to tessellata".

Reviewing the material at hand, quite a few specimens cannot be assigned clearly to either taxon and the odd sheet will bear a mixture of both taxa, confirming the observations of Case and Erskine. Checking each diagnostic character, all fail equally. Therefore a realistic reappraisal of their taxonomy calls for the following subordination of G. tessellata to G. repens.

Var. repens. 1-2 dm high. Rosette leaves typically ovate or broadly ovate, (1)-2-(3) cm long, (0.7)-1.2-(1.8) cm wide, the midnerve not outlined in white. Raceme strongly secund. Perianth 3.5-4.0 mm long, the tepals becoming more or less squarrose at tip. Lip strongly gibbose at base, the gibbosity tending to be deeper than wide, abruptly contracted into a point which at first is spreading horizontally, soon becoming strongly reflexed. Ovary somewhat longer than the perianth in flower, elongating to 5-7 mm in fruit. -- From Labrador west to Alaska, south to North Carolina, regularly intergrading with the next in their area of sympatry.

Var. tessellata (Lodd.) stat.n., G. tessellata Lodd., Bot. Cab. 10: pl. 952, 1824. Averaging larger throught, 1.5-3.5 dm high. Leaves typically ovate-lanceolate, 2.0-4.5 cm long, 1-2 cm wide, the midnerve weakly and interruptedly outlined in white. Raceme varying from barely secund to strongly so. Perianth 4-5 mm long, the tips of the tepals remaining parallel, or the lateral sepals becoming sometimes squarrose. Lip less strongly gibbose, the gibbosity mostly somewhat longer than deep, the acumen straight and remaining so. Ovary 7-10 mm long in flower or in fruit. -- From Newfoundland to Ingolf in Western Ontario, south to New York State and, interruptedly, to Maryland.

Var. tesselata being known from Ingolf (DAO) just across from our borders, it is to be expected in adjacent Manitoba.

2. G. oblongifolia Raf. var. oblongifolia (G. decipiens (Hooker) Hubbard; Epipactis decipiens (Hooker) Ames) -- Rosette leaves with a heavy, double white line along the midnerve. Stem 2-4 dm high. Leaves 3.5-7.0 cm long, oblong to oblong-lanceolate, without white markings along the lateral nerves. Raceme less secund. Mid summer. Montane Pine woods: Cypress Hills and Rockies. -- (Aka), NS, (NB)-Q-O, swS-BC, US.

A remarkably disjunct species.

On Vancouver Island and adjacent Oregon one may find var. reticulata Boivin, a generally taller plant, 3.5-6.5 dm high, its basal leaves decorated with a fine reticulum in white.

#### 8. CALOPOGON Br.

Lip borne uppermost, as if the flower was inverted.

1. C. tuberosus (L.) BSP. var. tuberosus (C. pulchellus (Sal.) Br.) -- Grass-Pink, Swamp-Pink -- Scapose herb with about 3 large, showy, red flowers and a single, grass-like, basal leaf. 2-5 dm high. Perianth parts 1.5-2.0 cm long. Lip with a conspicuous yellow beard. First half of summer. Wet bogs: Vivian. -- NF-SPM, NS-seMan, US.

In our typical phase the leaf is + linear and overtopped by the stem. Var. latifolius (St. John) Boivin is a somewhat smaller plant, not over 2 dm high, bearing a relatively larger leaf, the latter rather lanceolate and equalling or overtopping the stem. It is a highly restricted costal plain variant barely surviving on two insular emergences, Sable Is. and Magdalen Is., of the largely submerged northern costal plain.

Current fashion favors Calopogon pulchellus as the scientific name of the "Grass-Pink", apparently in disregard of the International Code of Botanical Nomenclature. This was clearly pointed out by K.K. Mackenzie in Rhodora 27: 193-6. 1925. Briefly, the synonymy and argument are as follows.

Calopogon pulchellus Br. 1813 is based on Cymbidium pulchellum W. 1805, which is based on Limodorum pulchellum Sal. 1796, which is based on Limodorum tuberosum L. 1753.

Because Salisbury changed the epithet from tuberosum to pulchellum without valid reason, Limodorum pulchellum is an illegitimate name (Art. 63). By the same article Cymbidium pulchellum and Calopogon pulchellus are also illegitimate because their authors failed to adopt the earlier epithet of which they were obviously aware. Being illegitimate, neither of these three names can be used as the correct name of the "Grass-Pink" or anything else. Having now eliminated Calopogon pulchellus, what is the correct name of the "Grass-Pink"?

The synonymy given by Correll 1950 and many others implies that Limodorum tuberosum does not refer to the "Grass-Pink". If this were true then neither would Calopogon pulchellus refer to the "Grass-Pink", since the one name is ultimately based on the other. Article 7 covers this case: "an epithet which was nomenclaturally superfluous when published is automatically typified by the type of the epithet which ought to have been adopted". Hence Correll's synonymy is not tenable in any case. The two other names involved are mere transfers.

And what about this apparently prevailing view that Limodorum tuberosum does not refer to the "Grass-Pink"? Is it justified?

The linnean protologue of L. tuberosum encompasses two taxa; namely the "Grass-Pink" and a West Indian species of Bletia. Such heterogeneity is not in itself grounds for rejecting a name. The Code provides criteria and procedures by which the application of such names can be restricted to a single element and a proper type selected. And the present case is a relatively simple one.

Mackenzie demonstrated conclusively that the main element of the linnean protologue is obviously the "Grass-Pink". The other element is out of range, contributed little if anything to the linnean descriptions, and is only superficially similar to the "Grass-Pink". This is unambiguously corroborated by the Linnean herbarium where only two sheets are to be found under Limodorum. A photograph of the first one, number 1058.1, is before me. It is a Kalm specimen inscribed "tuberosum I" in Linné's script; it is a characteristic specimen of the "Grass-Pink" in flower.

The other specimen, number 1058.2, is inscribed Limodorum altum in Linné's script and is referable to a species published in 1767 in the 12th edition of the Systema. It is a species of Bletia and not obviously relevant to the typification of the "Grass-Pink".

Since only sheet 1058.1 fits the linnaean protologue, it should undoubtedly be regarded as the type of

the species and tuberosus is the correct epithet to use for the "Grass-Pink".

We are not aware that Mackenzie's paper provoked any kind of reaction, except perhaps a faintly disparaging comment by Weatherby in *Rhodora* 28: 139. 1926. After discussing the typification of some Solidago Weatherby added: "In the similar case of Limodorum tuberosum Mr. Mackenzie chooses what corresponds to the former alternative; in this instance he adopts the latter -- without, as it appeared to me, arriving at any conclusive results." But Weatherby did not actually try to counter Mackenzie's argument or find fault with his premisses. Nor has anybody else tried to do so, to our knowledge. Mackenzie's argument seems quite sound and in accord with our present Code; we know of no valid reason not to accept his conclusions.

### 9. CORALLORHIZA Châtelain CORAL-ROOT

Parasitic herbs with the leaves reduced to bladeless sheaths.

- a. Tepals heavily lined in purple..... 3. C. striata  
 aa. Flowers smaller and merely spotted in purple.  
     b. Plant and flowers greenish..... 1. C. trifida  
     bb. Purplish..... 2. C. maculata

1. C. trifida Châtelain -- Coral-Root -- Greenish and smaller-flowered than the next two. Sometimes somewhat tinged in purple. Lip 4-5 mm long, white, usually dotted in purple, not spurred. Capsule 8-12 mm long, drooping. Early summer. Parasitic on roots of woody plants. --G, K-Aka, L-NF-(SPM), NS-BC, US, Eur.

2. C. maculata Raf. -- Dragon's Claws -- A simple purplish herb, leafless, with a raceme of purplish flowers. Lip 6-8 mm long, white, punctate in purple, with an inconspicuous spur 1-3 mm long, partly adnate to the ovary. Capsule 15-25 mm long. Early summer. Aspen and Pine Woods. --NF-(SPM), NS-BC, US, (CA).

Near the Pacific coast it is largely replaced by var. occidentalis (Lindley) Cockerell, a variant with a more open flower,  $\pm$  rotate, the lower tepals descending or reflexed; the column longer, barely shorter than the lip; the spur more obvious being only partly imbedded in the ovary tissue and prominent by  $\pm$  1 mm.

3. C. striata Lindley -- All perianth parts heavily lined longitudinally in purple. Tepals 10-14 mm long, the lip more deeply coloured. No spur. Capsule 12-20 mm long. Early summer. Rich woods. --Q-BC, US -- F. fulva Fern. (C. ochroleuca AA.) -- Herbage and perianth yellowish. Cypress Hills. -- (seQ, swS)-seAlta.

The albino f. fulva may be identical with Rydberg's C. ochroleuca, but this point needs a close check as Rydberg's description indicates a plant rather similar to the more southern C. Wisteriana Conrad. However, conflicting opinions on the subject do not affect the correct name of our plant; only its geographical range remains in doubt.

## 10. MALAXIS Sw.

## ADDER'S MOUTH

Lateral petals narrow, nearly filiform. Habitally similar to Listera, but glabrous and the leaves all basal or only one. Lip elongate.

- a. Leaves 2 or 3, all basal..... 1. M. paludosa  
 aa. Leaf solitary, cauline.  
 b. Lip acute, entire..... 2. M. monophyllos  
 bb. Deeply bifid at tip..... 3. M. unifolia

1. M. paludosa (L.) Sw. -- Bog-Orchid -- Small herb with 2-3 basal leaves and a scape bearing a raceme of greenish and erect flowers. Flowers small. Sepals 2-3 mm long, lanceolate. Lip 1.5 mm long, entire. Mid summer. Rare in Black Spruce bogs: McKague, Glenevis. -- Mack, Aka, wO, cS-cBC, (ncUS), Eur.

2. M. monophyllos (L.) Sw. var. brachypoda (Gray) F. Morris (M. brachypoda (Gray) Fern.) -- Similar to the first, the leaf solitary and appearing cauline because of a long sheathing base. Pedicels nearly erect. Lip 2-3 mm long, entire, deltoid-orbicular and contracted into a long, lanceolate tip. First half of summer. Boggy woods, rare or overlooked. --(Aka, NF), NS, (NB)-Q-wBC, US, (Eur).

The first known Saskatchewan sheet comes from Lake Waskesiu (SASK). It was originally identified as M. unifolia and was the source of the incorrect entries under this name in the earlier provincial lists.

In the Orchids the larger petal, termed lip, arises uppermost but is normally borne lowermost as a result of a half twist of the ovary and pedicel. Our var. brachypoda exhibits this normal torsion, but the alaskan and typical phase of the species lacks any such twist and the lip is then borne uppermost.

3. M. unifolia Mx. (Microstylis unifolia (Mx.) BSP.) -- Raceme lax below, becoming very dense at the tip. Pedicels widely spreading. Lip about 2 mm long, nearly squarish, deeply bifid. Mid summer. Wet woods, rare. --L-NF-(SPM), NS-O-(Man), US.

## 11. LIPARIS Richard

TWAYBLADE

Similar to Malaxis, lateral petals narrow, etc., but the lip broad, squarish to oblong. Leaves 2, basal.

1. L. Loesellii (L.) Richard -- Fen-Orchid -- Small herb with 2 basal leaves and a raceme on a short scape. Leaves broadly lanceolate. Flower pale green. Early summer. Springy places and bogs, uncommon. --NS-O-(Man)-cS, US, Eur.

## 12. CALYPSO Sal.

CALYPSO

Lip very strongly differentiated, the other appendages petaloid and not obviously differentiated into sepals and petals. Flower solitary.

1. C. bulbosa (L.) Oakes var. bulbosa (Cytherea bulbosa (L.) House) -- Venus' Slipper -- Single-leaved herb with a single, large and very showy red flower. Leaf ovate. Lip about 2 cm long, vaguely shoe-shaped, whitish with abundant purple veining, yellowish at tip and with 3 rows of yellow hairs. Other appendages 1.5-2.0 cm long, pink, lanceolate. Late spring and early summer. Bogs and wet coniferous woods, infrequent. -K-Aka,(NF, NS), NB-BC, US, Eur.

In the more western var. occidentalis (Holz.) Boivin the lip is bearded in white.

Aplectrum hyemale (Muhl.) Torrey was reported (as A. spicatum BSP.) from Norway House to Cumberland House by Hooker 1839, repeated by various later authors, but discounted by Scoggan 1957 and Breitung 1957. The justifying sheet (K) is labelled: Dr [ummond], between N [ew] Y [ork] and C [umberland] H [ouse]. In all likelihood this specimen came from the more eastern part of the stated region of collection, and Norway House may be a misreading of the abbreviation NY.

## Order 70. JUNCALES

Basically as in the Liliales, but the perianth reduced to chaff-like bracts. Flowers 3-merous. Grass-like in habit.

## 124. JUNCACEAE

RUSH FAMILY

The basic and unreduced type of the order.

- a. Seeds numerous; plants glabrous..... 1. Juncus  
 aa. Seeds 3; plants mostly pubescent..... 2. Luzula

## 1. JUNCUS L.

RUSH

Grass-like plants with bract-like floral parts; otherwise as in the Liliaceae, with 6 perianth parts, 3/6 stamens and a single 3-carpellate ovary. Each carpel



with many seeds. Stamens marcescent and available even when in fruit.

- a. Flower subtended by a pair of bractlets besides the usual bract at the base of the pedicel.
  - b. Inflorescence terminal..... Group A
  - bb. Inflorescence lateral ..... Group B
- aa. Flowers without accessory bractlets, only the usual bract at the base of each pedicel.
  - c. Leaves not septate..... Group C
  - cc. Leaves hollow and clearly septate with trans-versal plates..... Group D

#### Group A

Flower subtended by 3 bracts, one of which is at the base of the pedicel, the other two at the base of the perianth and are much shorter than the perianth parts. Inflorescence terminal, lax or diffuse, subtended by leafy bracts that are obviously distinct from the stem. Leaves not septate-nodulose.

- a. Annual; inflorescence tending to be half the height of the plant ..... 1. J. bufonius
- aa. Perennial; stem many times the length of the inflorescence.
  - b. Stem leafy, with at least one leaf borne at or above the middle..... 2. J. compressus
  - bb. Stem leafless; all leaves basal or involucreal.
    - c. Leaves terete; capsule exerted.....
    - ..... 4. J. Greenei
    - cc. Leaves flattened but usually involute..
    - ..... 3. J. tenuis

#### Group B

As in group A, but the inflorescence lateral, the stem being prolonged by one of the bracts which quite simulates the upper part of a stem.

- a. Flowers few, 1-3, the perianth mostly over 6 mm long; densely tufted herbs.
  - b. Capsule light brown, acute at tip... 7. J. Parryi
  - bb. Dark purple and  $\pm$  retuse..... 6. J. Drummondii
- aa. Flowers many; perianth shorter; rhizomatous.
  - c. Inflorescence borne towards the middle of the stem..... 5. J. filiformis
  - cc. Inflorescence borne in the upper quarter..
  - ..... 8. J. arcticus

#### Group C

Flowers lacking the accessory pair of bractlets. Leaves not septate-nodulose, mostly flat.

- a. Glomerules of 3 or more flowers.
  - b. Capsule 7-9 mm long.....12. J. castaneus
  - bb. Shorter 4-5 mm long..... 13. J. longistylis
- aa. Flowers less numerous, 1-3-(4) per glomerule.
  - c. Leaves all basal; stem with a single terminal glomerule.
    - d. Glomerule 2-flowered, purple-black...
      - .....11. J. biglumis
    - dd. Glomerule 3-(4)-flowered, pale coloured ..... 10. J. albescens
  - cc. Stem with 1-2 leaves and mostly 2 glomerules.
    - e. Tufted; glomerules of 1-2 flowers ...
      - ..... 9. J. stygius
    - ee. Stoloniferous, glomerules of (2)-3-(4) flowers..... 12. J. castaneus

## Group D

Flowers lacking the accessory pair of bractlets. Leaves hollow, cylindrical, nodulose with regularly spaced cross-partitions, somewhat in the manner of a stem of Grass or Equisetum; the cross-partitions becoming slightly prominent in drying.

- a. Flowers in small and few-flowered glomerules, these less than hemispheric.
  - b. Sepals somewhat shorter than the petals; tufted plants.....19. J. brachycephalus
- bb. Sepals obviously longer and narrower than the petals; stems borne singly along the rhizome.
  - c. Anthers 0.3-0.5 mm long. Perianth 2.0-2.5 mm high.....20. J. alpinoarticulatus
- cc. Anthers about 1.0 mm long; perianth 3-4 mm high.
  - d. Leaves equitant and mostly 3-4 mm wide..... 16. J. ensifolius
  - dd. Leaves roundish to somewhat flattened and narrower, usually less than 2 mm wide..... 17. J. nevadensis
- aa. Glomerules dense, hemispheric to globose.
  - e. Heads purple-black.
    - f. Head usually solitary.....18. J. Mertensianus
    - ff. Heads typically 3, leaves wider....
      - ..... 16. J. ensifolius
  - ee. Heads greenish brown to reddish brown.
    - g. Heads 1 cm wide or less..... 14. J. nodosus
    - gg. Heads wider, mostly 1.5 cm wide....
      - ..... 15. J. Torreyi
- 1. J. bufonius L. (var. halophilus Buch. & Fern.)
  - Toad-Rush (Herbe à Crapauds) -- Annual, tufted, the flowers mostly solitary and scattered on the branches.

Up to 2 dm high. Tepals rather variable in length and shape, pale green, with wide membranous margins. Mid to late summer. Shores, sometimes weedy. --G, seK-Aka, L-SPM, NS-BC, US, Eur.

2. *J. COMPRESSUS* Jacq. -- Like the following, but the stem leafy and the flowers smaller. Forming a dense carpet. Perianth 2 mm long or less, shorter than the capsule, the sepals cucullate at tip. Early summer. Rare introduction of grassy places: Brandon, Duck Bay. --NF, (NS-PEI), Q-Man, US, Eur.

There is a dot at the mouth of the Nelson River on a distribution map of *J. Gerardii* Lois. by Hultén 1958. We are not aware of any corresponding herbarium specimen.

3. *J. tenuis* W. var. *tenuis* (*J. confusus* Coville; *J. macer* S.F. Gay; *J. oronensis* AA.) -- Path-Rush, Poverty-Grass (Herbe de misère) -- Inflorescence terminal, subtended by long leafy bracts, the flowers scattered on the branches, not clustered. Stiffly erect, wiry stems mostly 3-5 dm high. Sheaths of the basal leaves ending in thin, membranous and usually triangular to lanceolate auricles. Sepals 3-4 mm long, as long as, or longer than, the capsule. Early summer. Common in wet places. -- (Aka), L-SPM, NS-BC, US, (SA), Eur, (Afr, Oc) -- Var. *uniflorus* Farw. (*J. Dudleyi* Wieg.) -- Auricles thick, hard, opaque, straw-coloured, rounded. Perianth often somewhat longer. --Y, (NF), NS-BC, US, (CA).

The more eastern plants are often subdivided into three varieties, with the taller and more loosely flowered plants being placed in var. *anthelatus* Wieg., while the smaller plants with crowded flowers on more widely divergent branches are placed in var. *Williamsii* Fern. Similar phenotypes occur in our area, but they do not seem to have ever been varietally distinguished, nor do they seem to be in any way significant.

The capsule may be completely (= *J. confusus*) or incompletely (= *J. tenuis*) divided in three locules by the placentae more or less projecting inward. The variation is continuous and not clearly linked to any other character; the distinction, when implemented taxonomically, seems arbitrary.

*J. tenuis* W. var. *secundus* (Beauv.) Eng. was reported as "occasionally met with between Edmonton and Little Slave Lake". The corresponding specimen (CAN) was long ago revised by F.V. Coville to the next species.

4. *J. Greenei* Oakes & Tuck. var. *Vaseyi* (Eng.) Boivin (*J. Vaseyi* Eng.) -- Similar but the fruit exceeding

the tepals. Perianth 3-4 mm long, the capsule 5-6 mm long. Inflorescence more congested, the flowers more crowded. Leaves quite terete, slightly channeled on the ventral side. Early summer. Wet open places. -Mack, L, NS, NB-BC, US.

The floral parts are smaller in the more eastern var. Greenei: perianth 2.5-3.0 mm, capsule, 3-4 mm long and the seeds also only half as long, mostly  $\pm$  0.5 mm.

5. J. filiformis L. -- Seemingly leafless herb, reduced to a wiry stem, 2-4 dm high, and bearing a small inflorescence halfway up. Basal leaves reduced to a sheath ending in a vestigial blade, filiform, not over 1 mm long. What appears to be the upper half of the stem is actually a long involucral leaf. Flowers greenish. Early summer. Wet places northward, apparently rare. -- G, K-Aka, L-SPM, NS-nS-BC, US, (SA), Eur.

6. J. Drummondii E. Meyer (var. subtriflorus (E. Meyer) Hitchc.) -- Smaller than the similar J. balticus and the inflorescence reduced to (1)-2-3 pedicellate flowers, usually dark purple. In compact tufts only 1-2-(4) dm high. Involucral bract merely 1-2 cm long. Early summer. Moraines and alpine prairies. -- swMack-Aka, swAlta-BC, US.

The tepals vary in length from 4 to 7 mm and the capsule from 4 to 7.5 mm. The amplitude of variation is apparently the same throughout the range, but the frequency is not. Most plants from the Rockies (var. subtriflorus) have tepals and capsule 6-7 mm long. Further west most plants have the tepals 4-6 mm long and the capsule will most often overtop the perianth. But if those criteria are applied coldly, both phenotypes will prove to have essentially the same range. Hence we contend var. subtriflorus does not denote a particular population, it merely designates a statistical concentration of particular individuals exhibiting a certain arbitrarily delimited morphology. At most, var. subtriflorus could refer to a frequency pattern of a certain morphological type.

Throughout this flora we have refrained from naming or recognizing variations justified statistically. But we are fully aware that many other biologists, especially zoologists, have a different philosophy and will recognize statistically definable populations as varieties or subspecies or even species. The recognition of statistical variants requires the support of a large collection. Amateurs, ecologists and others who do not normally have access to representation in depth cannot be convinced and recognize such variants, they

can only name them on the basis of the locality, or ignore them, or accept the work of the specialist on faith. The latter is not particularly commendable as a scientific attitude and we are not inclined to impose such a choice upon our readers.

7. J. Parryi Eng. -- Flowers typically 3, large, straw-coloured to pale reddish-brown. Resembles the preceding, but the involucre bract about twice the length of the inflorescence. Capsule narrowly acute at tip. Mid summer. Open montane and alpine slopes. -- swAlta-BC, US.

8. J. arcticus W. var. arcticus -- Like J. filiformis, a wiry and seemingly scapose herb with a secund inflorescence borne toward the upper fifth. Mostly 2-4 dm high and growing in conspicuous lines of stiff stems strung along the nearly simple rhizome. Inflorescence purple black, short, and few-flowered, usually around 1 cm long, and of (1)-3-5-(8) flowers. Outer tegules acute to acuminate, the inner ones less sharply so or ± rounded at tip. Filament 1-2 times as long as the anther. Capsule ellipsoid, varying from included to exerted by 1-(2) mm. Early summer. Shores and wet tundra. -- G-Aka, L, Q-nMan, Eur -- Var. littoralis (Eng.) Boivin (J. ater Rydb.; J. balticus W. var. littoralis Eng., var. montanus Eng., var. vallicola Rydb.) -- Inflorescence not so dark-coloured, more open and more heavily flowered, the branches very uneven, the longer ones mostly up to 2-3 cm long. Tegules 4-6 mm long, typically bicolour and mainly purplish, but with a broad median green zone, acute to acuminate at tip. Filament commonly only half as long as the anther. Capsule ellipsoid, ± included. First half of summer. Shores and wet ground; common and often pioneering. -- (G), seK-(Mack)-Y-(Aka), L-(NF-SPM, NS-PEI)-NB-BC, US.

Var. littoralis (Eng.) stat. n., J. balticus W. var. littoralis Eng., Trans. Ac. Sc. St. Louis 2: 433. 1866.

Many botanist have experienced difficulties in distinguishing J. arcticus and J. balticus. In the southern Mackenzie basin Raup 1947 found all his material to be intermediate and he placed it under J. balticus sensu amplo, although J. arcticus was an earlier name. We have similarly been unable to establish a clear discontinuity between these two taxa and consequently we regard them as geographical variants of a single species. Phenotypes with petals a bit shorter, broader, less acute and more widely margined (= var. montanus, var. vallicola) will be found to occur here and there as far as the east coast and do not seem to be in any way restric-

ted geographically.

9. J. stygius L. var. americanus Buch. -- Generally quite similar to J. Drummondii, but the stem bearing 1 leaf and the flowers sessile. Usually around 2 dm high. Flowers greenish with strong red lines, in 1-(2) glomerules of 1-3 flowers each, their perianth 4.5-5.5 mm high. Capsule (5.0)-6.0-(7.5) mm long, at first green, turning ± purple or brownish, especially on the angles. Mid summer. Bogs, rare. --(Mack)-Y-Aka, L-NF-(SPM), NS, NB-O, nS-nBC, (US, Eur).

The eurasian var. stygius has a smaller perianth, 3.4-4.5 mm high, and an often shorter fruit, 5-6 mm long.

10. J. triglumis L. var. albescens Lange -- (J. albescens (Lange) Fern.) -- The single glomerule terminal and bicolour or whitish, the tepals being almost entirely membranous but the bracts mostly reddish brown. Stem leafless, mostly 1-2 dm high. Glomerule becoming darker and often ± brown at maturity. Involucral bract small and inconspicuous, often no longer than the glomerule, more commonly overtopping it briefly. Often resembling the last, but the capsule smaller, only 3-4 mm long, turning brown to purple black. Perianth 3-4 mm high, the tepals broadly lanceolate, acute or acutish. Stamens included, usually about 3/4 as long as the tepals. Early summer. Shores and calcareous bogs in mountains and arctic or subarctic regions, often pioneering. -- G-Aka, L-NF, Q-nMan-nS-BC, US, (Eur).

A circumpolar species readily divisible into three geographical varieties. There is a fair amount of variation in any area and a certain degree of intergradation in criteria, yet nearly all specimens examined were readily referable to the expected local variation. Thus we would refer all neogean specimens to var. albescens as described above. The european material is referable to the typical var. triglumis with bracts usually of a deeper brown, becoming dark brown, and the exserted capsule becoming deep purple brown, hence the fruiting head much darker; lowest bract nearly always shorter than the glomerule; tepals 3-4 mm long, acute to rounded (especially the petals) at summit, usually turning rusty brown; stamens about as long as the perianth or more often slightly exserted; capsule usually exserted by 1-2 mm.

Asiatic material is referable partly to var. triglumis, partly to var. fuscatus Regel (= J. Schischkinii Krylov & Sumn.). At flowering time the latter resembles var. albicans by its paler and strongly bicolour inflorescence. Also var. fuscatus has a slightly larger perianth, 4-5 mm high, its tepals narrowly triangular lan-

ceolate and narrowly acute, its stamens and mature capsule about reaching the top of the perianth; the lowest bract shorter than the inflorescence.

There has been much confusion about the proper taxonomic disposal of the North American plants; some authors have called them J. triglumis, others J. albescens, others still (e.g. Hultén 1962) have detected both entities on our continent. But, using the criteria above, we would place all neogean specimens examined into var. albescens.

11. J. biglumis L. -- Pretty much as above, but the glomerule only 2-flowered and deep red-purple. Capsule purple black throughout or more commonly pale green with the sutures outlined heavily in dark purple. Mid summer. Rare on wet cliffs and wet alpine slopes. -- G-Aka, L, Q, nMan, swAlta-BC, US, Eur.

12. J. castaneus Sm. -- Similar to the last three, but stoloniferous, the stolons ending in a small bulb. Mostly 2-4 dm high. Glomerules red-brown, the lowest subtended by a bract overtopping the inflorescence. Capsule largest, 7-9 mm long. First half of summer. Wet peaty soils; subalpine or subarctic to arctic. -- G-Aka, L, Q--nMan-(nS)-swAlta-BC, US, Eur -- F. pallidus (Hooker) Boivin -- Glomerules of a lighter colour, yellowish to pale green: Churchill. --nMan, (Eur).

13. J. longistylis Torrey -- Tepals largely membranous and somewhat longer than the capsule. About twice taller than the preceding, which it resembles. Stoloniferous. Stem leaves 2-3. Capsule 4-5 mm long. Mid summer. Wet meadows. --NF, Q-BC, US.

14. J. nodosus L. -- Typically the flowers are in a few, reddish-brown, globular glomerules. Stoloniferous and forming dense colonies, the stem and leaves thin and wiry. Tepals 3-4 mm long, overtopped by the bright, brown, acuminate capsule. First half of summer. Wet meadows, especially along shores, common. --Mack, (Aka), NF, NS-BC, US.

15. J. Torreyi Coville -- Resembling the preceding but coarser, the heads nearly twice bigger and the leaves stiffly arching. Stoloniferous and forming numerous bulbs. Mid summer. Infrequent at the edge of sloughs and along slightly alkaline watercourses. --swQ-BC, US.

Two Manitoba collections were reported as J. canadensis J. Gay by Scoggan 1957. The first, Macoun, Manitoba 1872, (MTMG) is too immature for positive identification. Tentatively we have referred it to J. brachy-

cephalus. It may result from a label mixture since Macoun makes no mention of it in his Catalogue, and we have not noticed a corresponding collection at CAN.

The second collection, Denike, Birds Hill, 1942 (DAO), has been revised tentatively to J. Torreyi, being also too immature for positive identification.

16. J. ensifolius Wilkstr. var. ensifolius -- Leaves flat, largest, 3-5 mm wide, and equitant, that is conduplicate and the two halves fused face to face, like an Iris leaf. Mostly 3-5 dm high. Sheaths not auriculate, or rarely subauriculate. Heads (2)-3-5-(8), subglobular, dark brown to purple black. Tepals subequal. Stamens 3, opposite the sepals, the anthers shorter than the filaments. Early summer. Wet spots in the mountains. --Aka, Q-O, swS-BC, US, (Eur) -- Var. montanus (Eng.) Hitchc. (var. major AA.; J. saximontanus Nelson; J. Tracyi Rydb.) -- Stamens 6, the anthers about as long as the filaments. Sheaths more or less auriculate. Heads often more numerous, up to 10-12. Petals usually somewhat shorter than the sepals. Bois  Coteau, and westward. Often at lower altitudes. --swS-BC, wUS.

Var. montanus has often been called var. major Hooker 1838 (see Boivin 1967, etc.), but there is an earlier var. major Meyer 1828 which is probably nomenclaturally identical to var. major Hooker and in any case precludes the use of a later homonym. Since the type of Meyer's name came from Unalaska, well outside the range of var. montanus, the two cannot be taxonomically identical. The latter name appears to be the correct one for our geographical variation.

The distinction between J. ensifolius (=broad-leaved, 3 stamens), J. saximontanus (=broad-leaved, 6 stamens), J. mertensianus (=narrow-leaved, monocephalous), and J. nevadensis (=narrow-leaved, many heads) is not as sharp as might be desirable, although nearly all specimens examined could be readily assigned to one or the other species. Reducing them to a set of varieties was considered, but it did not seem that the resultant classification would be clearly more satisfactory. The separation is weakest between J. ensifolius and J. saximontanus and we have finally rallied with some diffidence to the solution recently proposed by Hitchcock 1969 of reducing J. saximontanus to varietal rank while retaining the other taxa as species.

17. J. nevadensis Watson var. nevadensis -- Heads small and many, as the last, but the leaves narrow and roundish like the next. Mostly (3)-4-(5) dm high. Leaves weakly septate, roundish to somewhat flattened, (0.5)-



1.0-(2.0)mm wide, one of them (as in J. ensifolius and J. Mertensianus) borne near the middle of the stem. Auricles 1-4 mm long, 0.5-1.5 mm wide, rounded at tip. Mostly with 5-12 heads, these mostly less than hemispheric. Sepals short caudate, longer than the petals by 0.5-1.0 mm. Stamens 6, the anthers  $\pm$  1.0 mm long and slightly longer than the filaments. Early summer. Springy meadows; local: Hoosier and Cypress Hills. -- swS-Alta, US.

Often transitional to J. ensifolius var. montanus. A number of more southern varieties are reported of which var. badius (Suksd.) Hitchc. has somewhat smaller flowers in fewer heads.

18. J. Mertensianus Bong. -- Resembles J. ensifolius, but the leaves narrower and rather terete. Smaller and commonly only 1-3 dm high. Heads 1-(2), mostly broadly hemispherical. Perianth purple black. Stamens 6. Mid summer. Springy places, alpine or subalpine, often near glaciers: Rockies. --Y-Aka, swAlta-BC, US, (Eur).

Larger plants may have wider leaves, thus grading into J. ensifolius, or more numerous heads and grading into J. nevadensis.

19. J. brachycephalus (Eng.) Buch. (J. brevicaudatus (Eng.) Fern.) -- Inflorescence lax, with numerous small glomerules; leaves strongly cross-septate. Tufted. Sepals 2.5-3.0 mm long, the petals similar and slightly longer. Capsule 3.0-4.0 mm long, acute. Seeds  $\pm$  1 mm long. Mid summer. Occasional pioneer on wet ground. -- seK, L-SPM, NS-Alta, US.

Usually treated as two species, the name J. brachycephalus being restricted to plants with more open inflorescences and nearly ecaudate seeds, while in J. brevicaudatus the branches of the inflorescence are nearly erect and the seeds end in whitish appendages half as long as the body. True, there is a tendency for more northern plants to have a narrower panicle, but the tendency is hardly strong enough to justify a taxonomic distinction. The length of the appendages of the seeds is an important taxonomic character with many a species of Juncus, but there is no reason to suppose that it should be regarded as important in every case, and in the present case it seems to be a random variation of no obvious import.

20. J. alpinoarticulatus Chaix (J. alpinus Vill., var. fuscescens Fern., var. rariflorus Hartman; J. Richardsonianus Schultes) -- Similar, the flowers smaller and on less divergent branches. Stems closely lined up along the rhizome. Sepals 1.5-2.5 mm long, the

petals shorter and rounder. Capsule 2.0-3.0 mm long, obtuse at tip. Seeds  $\pm$  0.5 mm long. Just before mid summer. Shores. --G, (K)-Mack-Aka, L-NF, (NS)-PEI-BC, US, Eur.

Many segregates have been proposed, based mainly on the colour of the perianth, or on the florets being all sessile or partly pedicellate. The latter type has been variously called var. rariflorus, J. nodulosus Wahl., or J. Marshallii Pugsley. Such taxonomic refinements are of no obvious significance within our area.

J. alpinoarticulatus forms an obvious pair with the generally more southern J. articulatus L.; the morphological basis of their distinction is minimal. Of the many reported differences, the most reliable proved to be anthers length: (0.3)-0.4-(0.5) mm in our J. alpinoarticulatus, but (0.5)-0.6-0.7-(0.9) in J. articulatus. When specimens are sorted out on anther length, it turns out to be reasonably well correlated with the shape of the inflorescence; at least twice longer than wide in J. alpinoarticulatus, the main branches usually diverging at an angle of 15-30°, but ovoid to ellipsoid in J. articulatus and the main branches diverging at 30-60°. Others differences are usually mentioned, but their value is at best no more than statistical. Which means that the area of morphological overlap is so broad, these other characters are usually not discriminant; their significance cannot be assessed until the identity of a specimen has been ascertained from some other angle.

The use of J. alpinoarticulatus Chaix 1786 versus J. alpinus Villars 1787 was discussed in Journ. Bot. 66: 210. 1928 and Rhodora 35: 234-5. 1933. Both names were obviously intended by Villars for the same species and the protologue of the second name repeats the prelinnean synonym and place of collection given in the protologue of the first; hence it seems difficult to treat the two names as anything but synonymous, in which case the earliest name has precedence. One may speculate from prima facie evidence that Villars intended J. alpinus to be merely a shortened form of the more than sequepedalian J. alpinoarticulatus, but this is only a speculation and has no bearing on the typification of either name.

Juncus effusus L. was mentioned for Saskatchewan by Groh 1950, but we failed to locate any justifying collection. Manitoba reports, repeated by Hitchcock 1969, were discounted by Scoggan 1957.

## 2. LUZULA

## WOODRUSH

Ovary 1-celled and only 3-seeded. Otherwise as in Juncus, but the herbage commonly pilose or ciliate.

- a. Flowers all or mostly single at the end of obvious pedicels.
  - b. Inflorescence simple or nearly so....1. L. pilosa
  - bb. Inflorescence compound.
    - c. Anthers 0.7-1.4 mm long; tepals about 3 mm long..... 4. L. glabrata
    - cc. Anthers 0.3-0.5 mm long, tepals about 2 mm long.
      - d. Leaves 5-12 mm wide..... 2. L. parviflora
      - dd. Smaller, the leaves about 3 mm wide..... 3. L. Wahlenbergii
- aa. Flowers in glomerules.
  - e. Leaves thickened and rounded at tip.
    - f. Glomerules many and mostly shorter than their peduncle..... 8. L. campestris
    - ff. Glomerules mostly 3 and subsessile in a capitate inflorescence.... 9. L. hyperborea
  - ee. Leaves acute at tip.
    - g. Inflorescence compact and conspicuously nodding..... 5. L. spicata
    - gg. Inflorescence open or erect.
      - h. Glomerules (1)-3..... 6. L. confusa
      - hh. More numerous and on recurved pedicels..... 7. L. arcuata

1. L. pilosa (L.) W. var. americana R. & S. -- (L. acuminata AA.; L. saltuensis Fern.) -- Leaves very long-ciliate up to the callous tip. Leaves strongly dimorphic, the basal ones 3-10 mm wide. Inflorescence a subglobose umbel of long-pedicelled flowers. Flowers solitary or a few of them 2 to a pedicel. Late spring. Rare or overlooked herb of light woods. --NF-SPM, NS-cAlta, US.

The more western var. macrocarpa (Buch.) stat. n. L. rufescens Meyer var. macrocarpa Buch., Pflanzenreich 4, 36 (25): 47. 1906, has smaller leaves, the basal ones 1 dm long or less, 2-4 mm wide, the caulinary one smaller still by half.

The more southern var. carolinae (Watson) stat. n., L. carolinae Watson, Proc. Am. Ac. 14: 302. 1879, has partly compound umbels and its leaves are often larger, up to 15 mm wide.

L. acuminata Raf., a name often used for our plant, is now considered to be a nomen dubium.

2. L. parviflora (Ehrh.) Desv. -- Very open inflorescence, a compound (or twice compound) raceme. Glabrous or nearly so; 4-10 dm high. Typically with 5 stem leaves, the latter usually very long ciliate at the junction of the limb and sheath. Racemes somewhat congested. All pedicels subtended by a bract reduced to its sheath. Early summer. Infrequent native, mostly of disturbed places in woods. --G, (K)-Mack-Aka, L-SPM, NS, NB-BC, US, Eur.

The darker and more compact plants from more open habitats are often named var. melanocarpa (Mx.) Buch. Some B.C. and Alaska specimens with a more open panicle and paler perianth have been differentiated as var. divaricata (Watson) Boivin (= L. divaricata Watson), but such specimens occur throughout the range and further they are a misidentification since true L. divaricata does not extend that far north, being primarily a California species with eciliate leaves, more stiffly divergent pedicels and acuminate (but not noticeably paler) tepals.

3. L. Wahlenbergii Rupr. -- As above, but the leaves narrower and the whole plant generally smaller. All or most leaves less than 1 dm long and 5 mm wide or less. Stem 1-4 dm high and bearing only 1-3 leaves. Bracteoles strongly fimbriate. Tepals often somewhat fimbriate. Early summer. Wet places and shores in subarctic to arctic or subalpine to alpine situations. -- (G)-F-Aka, L, Q, nMan-(S)-Alta-BC, (US), Eur.

Some specimens, especially from the western part of the range, may be somewhat more glaucous and somewhat more sturdier plants, and on that basis are sometimes identified as L. Piperi. However the latter name properly belongs to the synonymy of L. parviflora.

4. L. glabrata (Hoppe) Desv. -- Resembles the previous two, but the flowers larger and purple black. Capsule also purple black. Mostly 3-4 dm high. Inflorescence often somewhat nodding. Early summer. Disturbed or rocky places, alpine to subalpine. Rockies. -- swAlta-BC, US.

5. L. spicata (L.) DC. -- The whole inflorescence conspicuously nodding. Densely tufted. Inflorescence congested, of a single glomerule or of a few closely set glomerules. Lowest bract usually equalling the inflorescence. The main bract under each flower as long as, or longer than, its flower. Early summer. Alpine slopes and mountain tops; also dry tundra at Lake Nuel-tin. -- G-(F)-K-Aka, L-SPM, (NS), Q, nMan, swAlta-BC, US, Eur.

6. L. confusa Lindeberg -- Densely tufted like the preceding, but the inflorescence stiffly erect. Glomerules smaller, 1-(3), the lower one, when present, on an elongate and stiffly erect peduncle. Lowest bract short, merely reaching the base of the glomerule, or even shorter. Late spring. Forming large tussocks on the tundra. --G-Aka, L, Q, nMan-neS, BC, (US), Eur.

A Drummond collection (GH) originally identified as L. hyperborea and later filed under L. confusa may have been the basis for extending the range of the latter to Alberta by Fernald 1950, repeated by Moss 1959, queried by Boivin 1967. This same collection may also be the source of an isolated Alberta dot on distribution maps by Raup 1947, Porsild 1957 and 1964, and Hultén 1962. Also an earlier report by Buchenau in the Pflanzenreich 4, 36(25): 71. 1906 for the "Felsengebirge". Still earlier, this same Drummond Rocky Mountains collection was reported by Hooker 1838 and Macoun 1888 as L. hyperborea var. minor. The latter varietal name is a synonym of L. confusa. But Drummond's specimen belongs with L. campestris, hence we are discounting all Alberta reports.

7. L. arcuata Wahl. (var. unalaschkensis Buch.) -- Branches of the inflorescence, and also, usually, the stems, arching. Only 1-3 dm high and growing in dense tufts. Inflorescence often branching in the manner of L. parviflora, the flowers in small glomerules. Early summer. Alpine slopes. -- Mack-Aka, swAlta-BC, (US, Eur) . Our plants are not consistently different from those of the Old World.

8. L. campestris (L.) DC. var. campestris (L. groenlandica Bøcher; L. multiflora (Retz.) Lej., var. contracta Sam., var. frigida (Buch.) Sam., ssp. comosa (E. Meyer) Hultén; L. sudetica (W.) DC., var. frigida (Buch.) Fern.) -- Blackcaps, Chimney-Sweeps -- Leaf gradually attenuate into a callous tip. Very variable. Leaves very long-ciliate, the cilia usually sparse, exceptionally deciduous. Stem leaves many and somewhat larger than the basal ones. Inflorescence subtended and overtopped by a leafy bract. Glomerules dark brown to purple black, small and tending to be spiciform. Tepals and capsule 2-3 mm long. Late spring. River shores and bogs. --G-K-(Mack-Y)-Aka, L-SPM, NS-BC, US, Eur -- Var. pallescens Wahl. (L. pallescens (L.) Besser) -- Inflorescence lighter in colour, pale brown to yellowish green. Plants often taller. Of more southerly distribution. --(NF), NB-S, US, (Eur).

9. L. hyperborea Br. var. hyperborea (L. arctica Blytt; L. nivalis (Laest.) Berl.) -- Leaves eciliate

or essentially so, not quite so clearly callous at tip as the last. Foliage mainly basal, the stem leaf slightly smaller and usually only one. Bract shorter than the inflorescence, the latter pyramidal and mostly  $\pm 1$  cm long. Flowers smaller, the tepals and capsule  $\pm 1.5$  mm long. (Summer?). Wettish tundra: Churchill, Lake Paterson. --G-Aka, L, nQ, nMan-(nS), neBC, Eur.

L. hyperborea has been applied now to L. confusa, now to L. nivalis. We contend that such conflicting usage is not ground enough to discard a name, otherwise many, if not most, of the older names would have to be replaced. Conflicting usage normally calls only for restriction through typification. In his original description Robert Brown described clearly L. hyperborea as a plant with flat leaves and foliaceous bracts: within the general area of the type collection only L. nivalis fits this description, hence we hold L. hyperborea and L. nivalis to be synonymous.

Grades to the northwest into var. latifolia (Kjellm.) Boivin, with somewhat larger leaves, the main ones up to 3-4 mm wide, the younger ones irregularly ciliolate. Also the inflorescence is laxer, the longest peduncle 1-5 cm long.